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MINK BREEDING--ELEMENTARY PRINCIPLES

By Robert K. Enders, Biologist, in cooperation with Swarthmore College and the Fish and Wildlife Service, Department of the Interior (Fur Resources, Division of Wildlife Research).

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To understand the importance of present-day research on the reproduction of fur animals and its application to breeding practices on fur farms requires some knowledge of the structure and function of the reproductive organs. Not only will such an understanding help the breeder to obtain the greatest return from his animals, but it will also put him on guard against work that passes for research, even when carelessly conducted and even more carelessly reported.

A description of certain fundamentals in the study of reproduction in minks is therefore presented, followed by three recommendations for breeding practice. The brief discussion following each recommendation will enable breeders to judge whether any of the procedures are applicable to their work.

Female Reproductive System

In figure 1 are generalized diagrams of the female reproductive organs of an animal that is of no particular species, but might be a mink, a marten, or a fox. Being much simplified, these diagrams show the reproductive organs only in sufficient detail to illustrate the discussion.

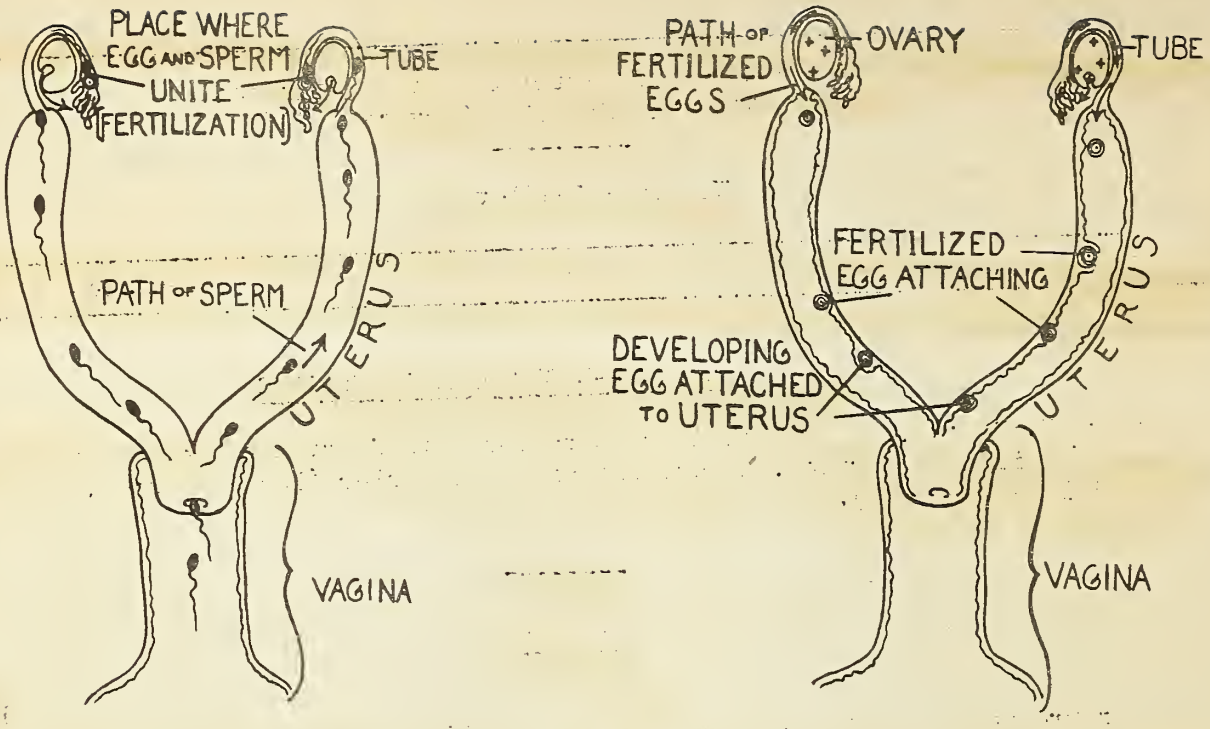

FIGURE 1: Left: Diagram showing the path of sperms from the vagina through the uterus to the upper ends of the tubes, where fertilization takes place, and also the spot from which the egg left the ovary. A single egg is shown in each tube, but sperms are shown along the entire tract. Right: Diagram showing the path of eggs from the tubes, where they were fertilized, to the place of implantation in the uterus.

Each essential part is labeled. The two ovaries are shown enclosed in the bend of the uterine tubes. The tubes connect the ovaries with the horns of the uterus, the two horns uniting before opening into the vagina, which terminates in the vulva, or external genital opening. Sperms are deposited in the vagina during copulation.

Causes and Time of Ovulation

The eggs, or ova, develop in the ovaries and break out when matured, or ripened. This breaking out is called ovulation. The eggs thus freed pass into the open end of the uterine tube, through which in turn they are carried to the uterus, or womb. Those that unite with a sperm and are fertilized attach or implant themselves in the soft lining of the uterus, but those that are not fertilized degenerate soon after reaching the uterus. This explains why no scientist has reported any material in the vagina recognizable as eggs.

In the mink ovary the eggs develop in waves. Throughout most of the year development proceeds just so far and then the eggs degenerate, although development stops long before they are well enough formed to be shed. As the short annual breeding season approaches, the eggs grown pro-

gressively larger before they degenerate. During the breeding season they grow to a stage where they will ripen and leave the ovary if the female is properly stimulated. The strength of the stimulus necessary to bring about ovulation varies with receptivity, and it also may vary with the individual animal.

Unless placed with an active male, a female will not ripen any eggs during the year, but if breeding takes place or if the two animals fight, the wave of eggs that is nearest to maturity usually develops and is shed. If these are fertilized and all goes well, a litter will result, but even a fight without copulation may release the eggs, though ovulation does not always follow either copulation or a fight.

If no eggs are near maturity, the female cannot ovulate. If she has previously ovulated during the same season, no amount of stimulation will cause a second ovulation.

Transport of Sperms

Sperms deposited in the vagina are forced up through the uterus by the muscular activity accompanying copulation, reaching the lower end of the tubes before the animals separate. The passage of the sperms through the tubes is not rapid, but the exact time required is not known. Those left in the vagina do not live more than a few hours, but those that arrive at the upper end of the tubes must live for 2 to 3 days, since the eggs will not be ready for fertilization during that period.

Fertilization

Under ideal conditions, fresh sperms are waiting in the upper end of the tube for the eggs to be shed. One sperm enters and fuses with, or fertilizes, each egg, which otherwise has a very short life. The site from which the egg was discharged now changes its function of egg formation to that of a body secreting a hormone that acts on the uterus.

Implantation

The fertilized eggs now pass down the tube to the uterus. This passage probably takes several days, during which the hormone secreted by the spots on the ovary from which the eggs were discharged has been acting on the uterus. The action of the hormone makes the uterus ready for the fertilized eggs, which, on arrival, sink well into the velvetlike lining and become implanted.

If the eggs fail to become either fertilized or implanted, the uterus continues to develop just as though they had been. This is called false pregnancy, or pseudopregnancy, and it lasts about as long as true pregnancy.

Recommendations

1. Males and females should not be placed together until it is certain that both are in full breeding condition. No date can be set for seasons because animals vary in this respect. Experience has shown that when

either animal is not ready, many early matings will be unproductive. Even though copulation takes place, the eggs may not be well enough developed to be fertilized, or the male may not have mature sperms. In the latter case pseudopregnancy may result. It is easier to obtain matings without the risk of fighting and injury if the season is well advanced. The chances of drawing a blank are thus reduced.

Full breeding condition can be determined or checked by studying a vaginal smear under a microscope. Since few breeders can interpret a smear at this stage, they should delay breeding the minks until early in March. Experienced breeders know, by the behavior of their animals, when the height of the breeding season has been reached.

2. Every mating should be checked for living sperms by a vaginal smear after the animals have separated. The materials and methods used are listed and explained in Wildlife Leaflet 215, Sperm Studies as a Guide in Fur-animal Breeding Practice, which may be obtained upon request from the Fish and Wildlife Service, Chicago 54, Ill. If no sperms are present, the female should be placed with another male. If copulation results, another vaginal smear should be taken. The eggs, in all probability, will have been stimulated by the first mating. They will mature, but without sperms they cannot be fertilized. Therefore, every reasonable attempt to obtain matings should now be made. Since the eggs will not be released from the ovary for about 48 hours after the first copulation, sperms deposited as late as the day after should be effective.

3. Another attempt should be made the next day to breed a female that has copulated. This should insure that plenty of fresh sperms will be waiting for the eggs as they emerge from the ovary. The usual practice of breeding 4, 5, or 6 days after the first copulation is justified, probably, by the impregnation of the few females that did not ovulate at the first breeding. Some females will not breed again, but this is not proof either that they are or are not pregnant.

Additional information on mink breeding will be found in Wildlife Leaflet 191, Mink Raising, a copy of which may be obtained from the Fish and Wildlife Service, Chicago, Ill.